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Citrus Insect Control For Summer 1960

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Lee Thompson (with upraised hand) takes the oath of office after being appointed Commissioner of Agriculture to fill the unexpired term of Nathan Mayo who passed away April 14. Looking on are Comptroller Ray Green, Secretary of State R. A. Gray, Supreme Court Justice Elwyn Thomas, Governor LeRoy Collins and Supterindent of Public Instruction Thomas Bailey.

VOL. 41 — NO. 5 MAY, 1960 BARTOW, FLORIDA

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Citrus Insect Control For Summer 1960

R. B. Johnson

W. L. Thompson
W. A. Simanton
R. B. Johnson

W. A. Simanton

Florida Citrus
Experiment Station
Lake Alfred,
Florida

W. L. Thompson

The summer spray season for citrus will follow a spring that was marked by low or moderate abundance of purple scale, red scale, and spider mites. Aphids were exceptionally plentiful in April and caused notable damage to young groves and to mature tangerine and Temple groves. Melanose infection of new leaves also was high. Rust mite infestations were higher than usual until April.

The month of May will bring rapid increases of whiteflies, citrus red (purple) mite, and rust mite, which will result in high populations in June and July.

Purple scale will increase moderately until July and will occur in most groves as light infestations. Parasite activity has greatly reduced purple scale populations in all areas during the past year and this effective natural control is expected to continue. Occasional groves may develop troublesome infestations. Red scale infestations will become increasingly heavier and more numerous as the season advances. The Indian River and Ridge districts are expected to be the first to develop high populations.

Chaff scale will be more prevalent than usual during early summer. Tangerines, Temples and early oranges for the fresh fruit market should be checked for chaff scale in time to apply control measures before damage occurs. Infestations of this scale, as well as purple scale, can cause green spots that downgrade the mature fruit.

Black scale and mealybug are not expected to become serious problems this summer.

Spray Program

The second basic spray of the year is the summer application for scale, whitefly and rust mite control. This should be a thorough application, because most of the scale and all of the whitefly larvae are on the undersurface of the leaves and because the best rust mite miticides have no fumigative effects. Time the summer spray to control the most important pest in each grove.

Scale Control: Even though scale insects are at a fairly low level this year, the summer scalicide should be applied to keep the infestation at a minimum. Red scale is generally more noticeable than purple scale and where this is true, the scalicide should be applied in July or early August. Where red scale is not a problem, the scalicide may be applied satisfactorily from mid-June through July. On tangerines, early varieties of oranges, and grapefruit, apply the scalicide before the fruit is infested, so it will be free of green spots when it is picked. If scale is of minor importance, the summer spray should be timed for optimum rust mite control.

Oil emulsion at 1.3 percent actual oil is effective and will also control purple mite, reduce greasy spot and remove some of the sooty mold. Oil, like most other insecticides, has certain disadvantages. It depresses the soluble solids in the juice and the later it is applied (August and September), the more likely it is to affect solids. A late summer oil may also retard degreening. If oil is applied on tangerines, it should not exceed 1 percent actual oil and should be applied before July 15. Either parathion or malathion is preferred on tangerines because a higher grade of fruit usually is produced with these materials than with oil. Oil should not be applied during dry weather or to weak trees because it may produce a leaf drop and dead wood.

An early summer oil spray may cause oil blotch on oranges this year. Because of the later bloom, some oranges may not be over 1½ inches in diameter by the first of June and will be susceptible to oil blotch. This injury may be caused any time an oil spray is applied when the fruit is between ¾ inch and 1½ inches in diameter.

Parathion at 0.25 pound active ingredient per 100 gallon is an effective scalicide. It does not affect soluble solids or color and can be applied anytime during the summer. It is especially recommended where color is important on tangerines and early varieties of oranges and grapefruit. Parathion does not control purple mite or greasy spot. A mixture of 0.15 pound of actual parathion per 100 gallon plus 0.5 to 0.7 percent oil is a very effective scalicide, will not

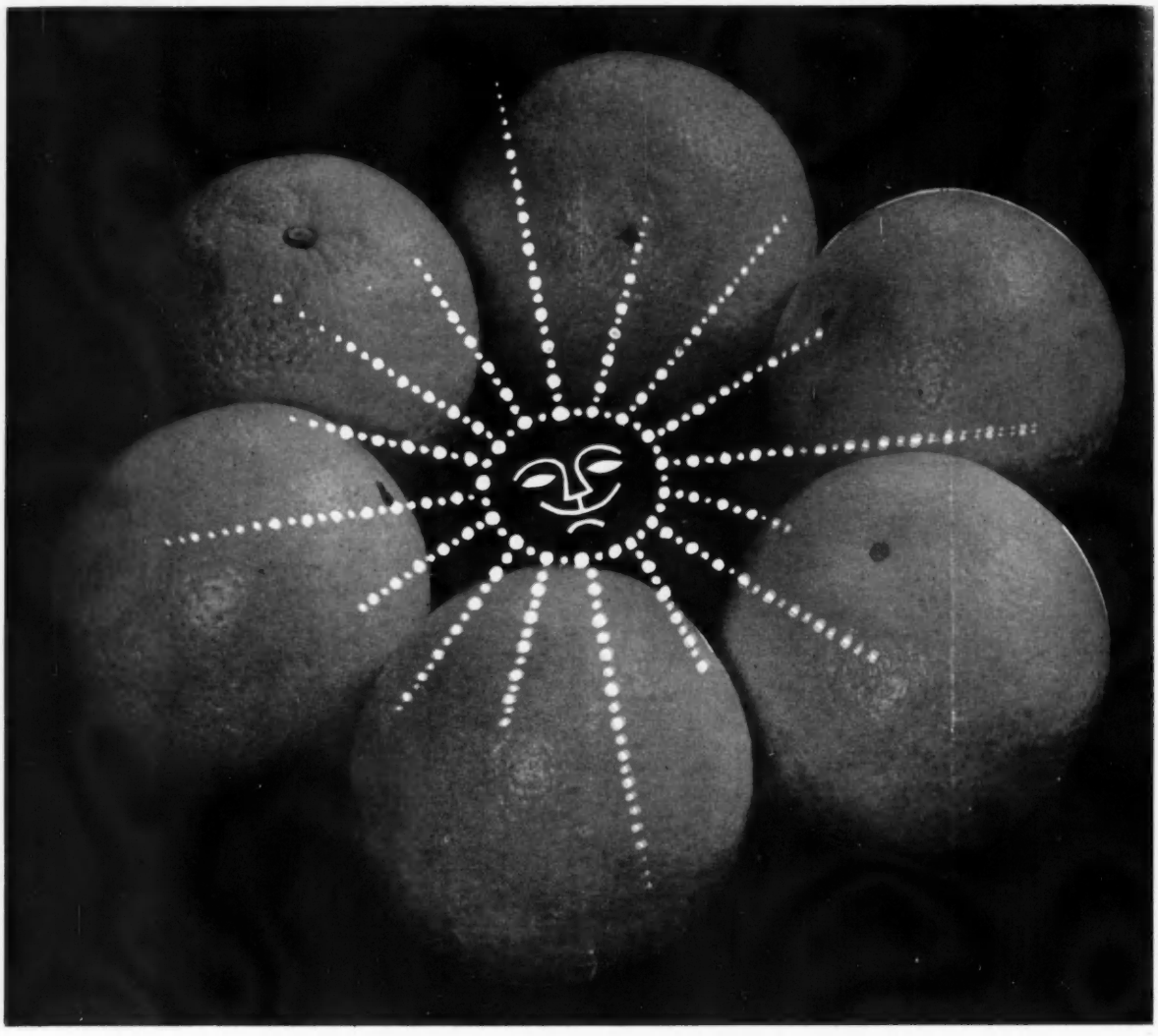
(Continued on pagee 13)

SCALE AND MITE ACTIVITY BY DISTRICTS *

District	Purple Scale	Red Scale	Purple Mite	Rust Mite on leaves
West Coast	1.19	.68	.57	1.54
Indian River	.92	1.37	.87	.85
Upper East Coast	1.01	.64	1.13	.25
Gainesville	1.00	.33	.83	.16
Orlando	.70	.29	1.36	.45
Brooksville	.88	.13	1.13	.88
Ridge	1.34	1.38	.96	.90
Bartow	1.18	1.18	1.90	1.70
State Average	1.04	.77	1.09	.84
Last Year	1.78	1.38	1.14	.82

*Second week in April. Activity is computed from populations, number of groves with increasing or decreasing infestations and percentage of scales in the settled crawler stage. Activity is considered high if above 2.0 for purple scale, 1.0 for red scale and 1.5 for mites.

*Written April 21, 1960. Reports of surveys by Harold Holtsberg, Fort Pierce; J. W. Davis, Tavares; K. G. Townsend, Tampa; T. B. Hallam, Avon Park; and L. B. Anderson, Jr., Lake Alfred.



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IV. The Use of Aqueous Extracts Pulp In The Production of Frozen Orange Concentrate[1] . . .

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As a means of summarizing information presented in the previous papers in this series, some comments and conclusions will be made on the use of water extracts of orange pulp in the production of frozen orange concentrate. This discussion may afford persons, who are concerned about the pulp washing process, some basis on which to decide whether this controversial process should be either used or discarded in the future.

Data obtained during this investigation showed that the characteristics in water extracts of orange pulp varied greatly and depended upon the pulp washing and other procedures used in the different plants and on the variety of fruit used. When samples of water extracts and orange juices, obtained from each plant at the same time, were compared on a 12° Brix or other equivalent basis larger quantities of water-soluble pectin and flavonoids were always found. Water-insoluble solids, pectinesterase activity, and oxalate-soluble pectin occurred in greater amounts in a majority of the extracts than in the juices.

It must be acknowledged that some of the substances extracted from orange pulp are factors involved in some of the problems which arise during the production, storage, and distribution of frozen orange concentrate. Pectinesterase activity, water-soluble pectin, and oxalate-soluble pectin are causative factors in the stability problems of gelation and clarification. Viscosity problems encountered during the concentration of orange juice in evaporators result chiefly from excessive amounts of water-soluble pectin and water-insoluble solids in the juice. Deposition of hesperidin on the interior walls of evaporators occurs more readily with juices containing large amounts of flavonoids. The quantity of water-insoluble solids in orange concentrate, which is related to the pulp content, affects the color of the concentrate and it is believed that it may also influence the flavor stability of this product.

It must also be pointed out that the effects of large quantities of any undesirable substance in a water extract will be minimized by its dilution when a relatively small volume of extract is mixed with a large volume of evaporator feed juice. That this is true is indicated by the information presented in Table 1, which shows the increases in amounts of some substances in reconstituted midseason and late season orange juices when an increase in yield of solids of approximately 5 per cent is obtained by mixing water extracts with these juices before concentration. Maximum values for each characteristic, except acid and ascorbic acid, found in all samples of midseason or late season extracts were used in Table 1, so that the greatest differences would be indicated. Minimum values for acid and ascorbic acid were used since they would cause a higher Brix/acid ratio and a lower ascorbic acid content. However, only very slight increases resulted in the values in the reeconstituted juices for acid and Brix/acid ratio, whereas no measurable difference was found in the amount of ascorbic acid. Addition of the midseason water extract to the evaporator feed juice increased the water-insoluble solids, flavonoids, water-soluble pectin, and oxalate-soluble pectin approximately 8, 9, 27, and 4 per cent, respectively. Also, when the late season extract and juice were mixed, these same characteristics increased approximately 9, 15, 42, and 21 per cent. Pectinesterase activity in a concentrate is determined chiefly by the temperature and/or time used for stabilization purposes rather than by the enzymic activity in the water extract of orange pulp. There were no apparent differ-

[1] Based on cooperative research by Florida Citrus Experiment Station and Florida Citrus Commission.
Florida Agricultural Experiment Station Journal Series, No. 1001.
Presented at 1959 Annual Meeting of the Florida State Horticultural Society.

ences in pectinesterase activity found by Atkins et al (1) between the midseason and late season concentrates from the 1956-57, 1957-58, or 1958-59 seasons. Average values for all of the concentrates from these 3 seasons were 5.2, 2.8, and 2.4 units, respectively. Calculated values for the water-insoluble solids, flavonoids, and water-soluble pectin in the midseason and late season reconstituted juices, as listed in Table 1, are also given in Table 2, together with average values (1) for commercial samples of frozen orange concentrate obtained during the 1956-57, 1957-58, and 1958-59 citrus seasons. Oxalate- and sodium hydroxide-soluble pectins were not determined for these samples. It should be recalled that the pulp washing process was not being used, or if so to no significant extent, in Florida during the 1956-57 season. Flavonoids were the only substances which were markedly greater in the midseason reconstituted juice than the average values found in the commercial concentrates when midseason oranges were being processed in the 1956-57 season. Likewise, water-insoluble solids were the only substances found in greater amounts in the late season reconstituted juice. Thus, as previously indicated, it becomes evident that substances in water extracts, which are related to problems in the concentrate industry, are diluted to a very great extent when the extracts are mixed with evaporator feed juice. Substances in water extracts of orange pulp responsible for such characteristics as bitterness and astringency will also be diluted in a similar manner, so that any increase in their intensity in the orange concentrate will be practically undetectable.

As yet technical data have neither been published nor made generally available to the concentrate industry which would indicate that the additional use of water extracts of orange pulp will either improve or harm the initial flavor of frozen orange concentrate or its flavor after periods of storage. It is believed that there are other factors, such as quality of the fruit used, adjustment of the level of orange oil, and proportion of early season fruit used, which are more influential on the flavor of frozen orange concentrate than that of the use of water extracts of orange pulp.

A comparison of the flavor of commercial samples of frozen orange concentrate collected from Florida plants during the past 3 citrus seasons has been previously reported (5) and is shown in Table 3. The flavor of the samples of concentrate produced when midseason oranges were available, as evaluated by a small taste panel, was slightly better in the 1958-59 season than in the 1957-58 season when many freezes occurred in Florida. However, the flavor in the midseason 1956-57 samples was considerably better than in the concentrates packed during the 1958-59 season. Several conditions, other than pulp washing, existed during the 1958-59 season which may have caused this difference in flavor. Such conditions included (a) effect of freeze damage to trees on the flavor of fruit produced the following season, (b) use of bulk concentrate made from freeze-damaged fruit but not used during 1957-58 season, and (c) use of high stabilization temperatures. The latter is indicated by average values reported (1) for pectinesterase activity in all of the samples from the 3 seasons of 5.2, 2.8, and 2.4 units beginning with 1956-57. Results in Table 3 also show that the late season concentrates from the 1958-59 season were very much better in flavor than those produced when freeze-damaged fruit was extensively used and also slightly better than the products packed during the 1956-57 season.

The water extraction of orange pulp should be considered as an additional process which can be used, if desired, in the production of frozen orange concentrate. Therefore, it should be evaluated in the same manner as other processes, such as extraction of juice, finishing of juice, and stabilization of juice by heat treatment. Any of these processing procedures may be abused and, if so, will have a detri-

Table 1. Changes in characteristics of reconstituted orange juices resulting from use of water extract of orange pulp in the production of orange concentrate.

Characteristics	Midseason			Late season		
	To evaporator		Reconstituted juice from concentrate[3]	To evaporator		Reconstituted juice from concentrate[3]
	Orange juice[1]	Water extract of orange pulp[2,3]		Orange juice[1]	Water extract of orange pulp[2,3]	
	95 gal.	5 gal.	100 gal.	95 gal.	5 gal.	100 gal.
Brix value	12.2°	12.0°	12.2°	11.6°	12.0°	11.6°
Acid as citric — %	0.96	0.73	0.95	0.82	0.63	0.81
Brix/acid ratio	12.7	16.4	12.8	14.1	19.0	14.3
Ascorbic acid — mg/00 ml	56	48	56	40	35	40
Water-insoluble solids — mg/100 g	147.1	377.3	158.6	197.3	546.0	214.7
Pectinesterase activity[4]	3.3	11.0	3.7	2.9	14.1	3.4
Flavonoids as hesperidin[5] — mg/100 ml	85.6	236.6	93.2	61.0	245.3	70.2
Pectic fractions soluble in						
Water — mg/100 g	36.7	234.0	46.6	24.3	231.0	34.6
Ammonium oxalate — mg/100 g	38.2	75.9	40.1	31.5	129.7	36.4
Sodium hydroxide — mg/100 g	23.9	43.7	24.9	18.3	97.0	22.2

1 Average values for 9 midseason and 8 late season orange juices from same plants producing water extracts of orange pulp.
2 Maximum values for all characteristics, except 2, in samples of midseason and late season water extracts of orange pulp; minimum values for acid and ascorbic acid.
3 Values calculated.
4 Pectinesterase activity measured as (PE.u.)g soluble solids X 1000. Values after 85 per cent inactivation of enzyme in juice and extract during processing.
5 Determined by an adaptation of the Davis method (2, 3).

Table 2. Comparison of some characteristics in commercial samples of frozen orange concentrate with those in concentrates produced from orange juice and water extracts of orange pulp.

Characteristics	Reconstituted juice from concentrate[1]	Average values in reconstituted juices from concentrates[2]		
		1956-57	1957-58	1958-59
	Midseason samples			
Water-insoluble solids — mg/100 g	159	179	167	161
Flavonoids as hesperidin[3] — mg/100 ml	93	83	85	83
Water-soluble pectin — mg/100 g	47	43	43	48
	Late season samples			
Water-insoluble solids — mg/100 g	215	184	162	165
Flavonoids as hesperidin[3] — mg/100 ml	70	76	88	75
Water-soluble pectin — mg/100 g	35	39	39	43

1 Calculated values from Table 1.
2 See literature cited (1).
3 Determined by an adaptation of the Davis method (2, 3).

mental effect on the quality of the orange concentrate.

Results reported in the 3 previous papers in this series showed that both satisfactory and unsatisfactory aqueous extracts of orange pulp were obtained depending on the extraction and other procedures used in the commercial plants. The more acceptable extracts were those collected from plants where (a) the extraction process was carried out rapidly and under good sanitary conditions, (b) centrifuges were used to greatly reduce water-insoluble solids, pectinesterase activity, and oxalate-soluble pectin in the extract before mixing it with evaporator feed juice, and (c) recycling of the extract was not a part of the extraction process. Thus equipment and procedures are available with which fruit solids can be satisfactorily recovered from orange pulp. Characteristics of water extracts obtained by these processes were such that no reason is evident from data available at this time for not using them in the production of frozen orange concentrate.

Table 3. Frequenecy distribution of flavor grades for samples of commercial frozen concentrated orange juices collected from Florida processing plants[1]

Flavor grade[2]	1956-57 Number of samples	1956-57 % of samples	1957-58 Number of samples	1957-58 % of samples	1958-59 Number of samples	1958-59 % of samples
			Midseason packs:			
Good	39	34	1	1	9	8
Fair	74	65	88	89	102	86
Poor	1	1	10	10	7	6
Totals	114	100	99	100	118	100
			Late season packs:			
Good	60	61	22	23	57	72
Fair	37	38	68	73	22	28
Poor	1	1	4	4	0	0
Totals	98	100	94	100	79	100

1 Samples collected semi-monthly from December through June, inclusively, during each processing season. Samples of midseason packs collected from December 1 to March 15, inclusively, for the 1956-57 season; from December 1 to February 15, inclusively, for the 1957-58 season; and from December 1 to March 15, inclusively, for the 1958-59 season. Late season packs were processed following these midseason periods and samples were collected until sometime in June.

2 Based on the evaluation of the flavor of 212 samples for the 1956-57 season, 193 samples for the 1957-58 season and 197 samples for the 1958-59 season. Each of the reconstituted juices from the concentrates was tasted at 3 different times by a small taste panel. The data for the 1956-57 season are based upon 4452 individual flavor grades; for the 1957-58 season on 3377 grades; and for the 1958-59 season on 3402 grades.

Economic factors are also involved in considering the pulp washing process, which is still a controversial subject in the citrus industry. An increase in yield of orange solids is obtainable. Olsen et al (4) obtained a 6.5 per cent increase in yield in a pilot plant study comparing double finishing of juice with single finishing followed by 3 successive water extractions of the orange pulp. Increases in yield from 3 to 5 per cent have been indicated in commercial pulp washing operations. Since pulp washing is an additional process in concentrate production, cost of additional equipment and its installation, together with operational and maintenance expenses, must be considered. Evaporation of the water from the extracts results in additional expense and may also cause a decrease in the rate of production of concentrate, especially in plants where evaporation capacity is limited. With such additional expenses, the incentive to use the pulp washing process will be greater when the cost of fruit is high than when oranges may be purchased at a low price. Thus it is believed that these economic factors, rather than the characteristics of satisfactory water extracts of orange pulp, will perhaps determine whether the pulp washing process will be used or discarded in the future.

ACKNOWLEDGMENTS

Thanks are extended to the commercial companies from whom samples of orange juices, orange pulps, and water extracts of pulp were obtained. The release of information about the pulp washing processes which were being used in the various plants was also appreciated.

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Citrus Vinegars By Commercial Process May Offer Promise

Lake Alfred, Fla. — Excellent vinegars from orange, grapefruit and tangerine juices have been produced at the Citrus Experiment Station here by commercial processes. If they ever get on a comparable cost basis, they may compete with the apple cider product and give an additional outlet for Florida citrus.

Dr. R. R. McNary, now retired, and M. H. Dougherty of the State Citrus Commission also made a vinegar with an entirely different and delightful aroma and flavor from press liquor from citrus feed mill operations. This material is ordinarily made into citrus molasses.

Using submerged fermentation type of equipment patterned after current commercial practice, the investigators produced over 100 gallons of each of the four kinds of vinegar. People throughout the country who have sampled it have made very favorable reports on it.

The press liquor from feed mill operations had to be given special treatment to eliminate peel oil before it could be used.

Principal drawback to immediate commercial production of citrus vinegar, according to McNary and Dougherty, is production cost higher than that for apple cider vinegar. They think it entirely possible that citrus vinegar may become a competitor in the wine vinegar market.

McNary and Dougherty have written a bulletin on citrus vinegar making, which probably will be printed in the first half of 1960 by the University of Florida Agricultural Experiment Station at Gainesville.

26 Years Of Citrus Costs And Returns In Florida---1931-57

(Concluded From Last Issue)

Operating costs in 1947-48 were only $1.51, or one percent, less than for the previous season. Such costs in 1949-50 were 21 percent less than in 1946-47, and eight percent less than in 1948-49. The 1950-51 operating costs were $160.67, or 27 percent more than 1949-50, and 78 cents more than the next highest season of 1946-47.

The 1956-57 costs were 27 percent higher than 1950-51 and 455 percent of the lowest cost season of 1934-35. Operating costs per acre in 1957-58 were $217.56, the highest of these seasons.

Operating costs exceeded 50 cents per box seven times in the 26 seasons, 1931-32, 1933-34, 1944-45, 1946-47, 1954-55, 1955-56 and 1956-57. The average for all seasons was 46 cents. During the 1939-44 period, when operating costs were increasing on the per-acre basis, the per-box costs fluctuated from 30 to 33 cents.

Such costs were 52 cents in the 1944-45 season. Hurricane winds materially reduced the fruit harvested in 1944-45, which increased the costs per box. Also, an increase of 25 percent over the previous season in operating costs per acre further increased the per-box costs. Eight of the 26 seasons had operating costs of less than 40 cents per box, and seven of these seasons were in the 1937-44 period.

Operating costs per box averaged 72 cents during the 1956-57 season, the second highest of the 26 seasons. The range was from 14 cents to $3.81. Forty-four percent of the groves had such costs of less than 50 cents. Another 30 percent had costs from 50 to 79 cents and 26 percent had costs of 80 cents or more per box.

Operating costs per acre by individual groves ranged from $55.51 to $423.31 in the 1956-57 season and averaged $204.39. On 44 percent of the groves $200 or more per acre was spent for operating costs that season.

More money was spent for labor, power and equipment than any other cost titem. The average was $52.18 per acre per season and ranged from $17.33 to $116.14. This cost exceeded the cost of fertilizer materials in 18 of the 26 seasons. The spread between the costs of the two items increased during recent seasons with the cost of labor, power and equipment increasing faster than fertilizer materials. There were 10 seasons, 1933-42, when the operating costs did not amount to as much as the cost of the one item of labor power and equipment for any one of the past 11 seasons, 1946-57. Money spent for this item was $116.14 per acre in 1956-57, the highest of the 26 seasons.

By ZACH SAVAGE
Agricultural Economist
Florida Agric. Experiment Station

The increases in the number of boxes harvested as this period progressed lessened very materially the increases in the cost on a per-box basis. Labor, power and equipment costs per box were 27 cents in 1946-47, an increase of four cents over the previous season. Such costs were three cents less in 1947-48 than in 1946-47, and decreased to 19 cents in 1948-49 which was five cents less than 1947-48. The average for the 26 seasons was 21 cents.

The cost item of second importance was fertilizer materials. This item was 35 percent of the average operating costs and amounted to $39.62 per acre. The range in the seasonal cost per acre for fertilizer materials was from $17.74 to $66.43. During 38 percent of the seasons this item averaged less than $30 per acre.

Fertilizer cost was $37.92 per acre in 1931-32 but was not that high again until the 1943-44 season. These costs increased for the following three seasons when the high up to that time of $57.33 was reached in 1946-47. There was a reduction of 32 percent in such costs in 1948-49 as compared to 1947-48, and a further reduction of 5.6 percent in 1949-50 under 1948-49.

A major contributing factor was low fruit prices. Fertilizer material costs increased to $66.43 in 1954-55 which was the highest of the 26 seasons. Fertilizer expenses for 1956-57 at $55.80 per acre was a decrease of 16 percent under 1954-55.

The amount spent varied from $14.27 to $141.28 per acre, and averaged $55.80. Twenty-five percent of these groves had less than $50 per acre cost for fertilizer, and 25 percent had such cost of $80 or more. On 50 percent of these groves, the money spent for fertilizer ranged from $50 to $79.

Fertilizer costs per box varied from 22 cents in 1931-32 to 11 cents in 1939-40 and 1940-41. There were 17 seasons with such costs less than 18 cents. Fertilizer cost was 18 cents in 1947-48, which was a decrease of two cents from the previous season; and 1948-49 showed a fertilizer cost of 12 cents, a decrease of six cents under the previous year. Such cost for 1956-57 ranged from five cents to 88 cents per box and averaged 20 cents. Fifty-three percent of the groves had a fertilizer cost of less than 20 cents per box and 66 percent less than 25 cents.

Nitrogen is an important element in fertilizers added in citrus production. The range was from 0.16 to 2.84 pounds of nitrogen applied per box, and the average was 0.63 pound.

There were 27 percent of the groves that had less than 0.50 pound applied per box, and 72 percent had less than 0.80 pound. There were 52 percent of the groves that received 0.60 pound or more. The usual recommendation as to the amount of nitrogen to apply is 0.40 pound per box of oranges anticipated and 0.30 pound per box of grapefruit. See Florida Agricultural Experiment Stations Bulletin 536.

There were 23 percent of these groves that received amounts of

(Continued on page 11)

Meet your ORTHO team...

CLIFF SUTTON

Manager of North Florida Branch of Calspray located in Orlando. Received his B. S. degree in agriculture from University of Florida. Call Cliff at Winter Garden Branch Office, OL 6-2626.

CHARLES ASHLEY

Received his B. S. in entomology from Auburn. Worked three years citrus spraying and two years as a laboratory assistant before joining Calspray. Resides in Leesburg, phone ST 7-2063.

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Joined Calspray in 1956 after receiving his B. S. degree in agriculture from University of Florida. Resides in Plant City—contact him by calling 3-8351.

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JOHN NOWELL

Received his B. S. degree in agriculture from University of Florida. Joined Calspray in 1955. John lives in Orlando. Reach him at GArden 4-6754.

RANDALL WILLIAMS

Randy sold livestock and poultry feeds before joining Calspray in 1957. Received his degree in agriculture from University of Florida Resides in Deland. Reach him by calling RE 4-0599.

26 Years Of Citrus Costs And Returns In Florida— 1931 - 1957

(Continued from page 9)

nitrogen within the range of 0.30 to 0.49. An additional 4 percent receives less than 0.30, making 27 percent that received less than 0.50 pound of nitrogen per box harvested. The remainder, 73 percent of the groves, received 0.50 pound of nitrogen, or more, per box. Twenty-eight percent of these groves reecived 0.80 pound or more per box of fruit. Nitrogen added per box of fruit harvested for the 11 seasons of 1941-52 averaged 0.53 pound.

Spray and dust material costs averaged $9.70 per acre for the 26 seasons and constituted 8 percent of the operating costs. There were 13 seasons, 50 percent, with spray and dust material costs of less than $8.00. The range of the seasonal averages was from $2.29 in 1935-36 to $23.36 in 1954-55 and was $17.75 in 1956-57. The range in such costs per box was from two to seven cents, and the average was four cents. Sixteen seasons, or 62 percent, had such costs of three cents per box or less.

Spray and dust materials cost $17.75 per acre, or six cents per box, in 1956-57. This cost per acre varied from nothing to $62.37. There were 4 groves, or 3 percent, that received no spray or dust. Fifty-two percent of the groves had such costs of less than $20 per acre, and 34 percent had such costs ranging from $5.00 to $14.99. Forty percent had such costs of $25.00 or more and on 13 percent it was $40.00 or more.

State and county taxes averaged $7.33 per acre for the 26-year period, or three cents per box. The range in such costs per season was from $4.07 per acre in 1942-43 to $12.74 in 1955-56. The seasonal average was less than $6.00 in 14 seasons, or 54 percent of the seasons. The second highest season was 1956-57 at $11.90 per acre.

The range in state and county taxes per acre for 1956-57 was from $0.00 to $40.53. Seventeen percent of these groves had taxes less than $10.00 per acre, 38 percent between $10.00 and $14.99, or 55 percent less than $15.00 per acre.

Miscellaneous cost averaged 5 percent of operating costs for the 26-year period, or $5.29 per acre. This amounted to two cents per box. Variations in seasonal averages were from $0.53 per acre in 1934-35 to $21.88 in 1955-56. Miscellaneous costs include such items as overhead, trees for replacement, city taxes, drainage district assessments, and fuel for grove heating.

Returns from fruit averaged $253.39 per acre for the entire period or $1.03 per box. Seasonal averages per acre varied from $50.10 in 1932-33 to $544.94 in 1945-46. The per-box averages varied from 38 cents in 1932-33 to $2.02 in 1944-45. Returns from fruit amounted to $136.41 per acre in 1947-48, the lowest since 1940-41.

However, there were eight of the 26 seasons with lower returns per acre. The price received for fruit in 1947-48 was 43 cents per box, the third lowest of these seasons. There were 14 seasons in which the per-acre returns were less than the average for the period and in these were 16 seasons when the per-box returns were less than the average.

Fruit returns were $391.03 per acre in 1948-49, an increase of 187 percent over the previous season. Another increase of 26 percent in 1949-50 brought fruit returns to $493.02 per acre, which was the third highest of the 26 seasons.

Likewise the returns per box showed an increase and was 43 cents in 1948-49, and $1.96 in 1949-50. The latter price is 4.6 times that for 1947-48. The price dropped to $1.14 in 1950-51 and 67 cents in 1951-52. The price for all fruit was $1.14 in 1956-57.

Yield and price determine the per-acre returns from fruit. High yields and high fruit prices resulted in pyramided returns per acre during the 12 seasons of 1942-46, 1948-51, and 1952-57, so much so, that the average of the 26 seasons was above any of the other 14 seasons. Average returns per acre for these 12 seasons was 4.1 times the average for the first ten years of these records.

There were six groves in 1956-57, 4 percent, that had returns from fruit less than $100 per acre, and 25 groves, 16 percent, with returns from fruit less than $200 per acre. Fifty percent of the groves had from $200 to $399 returns from fruit per acre. The range was fom $44.31 to $1063.89 per acre, and the average was $322.36.

The average on tree price received in 1956-57 was $1.14 per box. The range in price was from 13 cents to $3.99 per box. Twenty-five percent of the groves had an average fruit price of less than 80 cents and 43 percent received less than $1.00 per box.

The price received varied with a number of factors including kind and variety of fruit, whether processed or sold fresh, managerial salesmanship, internal and external fruit

quality, fruit size, total volume produced and groce location with reference to market outlets.

Returns above operating costs dropped from $407.33 per acre in 1945-46 to $56.09 the following season, a drop of 86 percent. Yet thee were eight of the 26 seasons of these records that averaged lower returns above operating costs than in 1946-47. There were eight seasons, 1942-46, 1948-51 and 1952-53 with income above operating costs exceeding the average for all seasons.

There were eight seasons that had income above operating costs per box higher than the 57 cent average. There were two seasons, 1932-33 and 1947-48, when operating costs exceeded returns from fruit. The returns above operating costs per acre ranged from –$21.97 in 1947-48 to $425.07 in 1943-44 and averaged $139.27. There were 13 seasons, 50 percent, when returns above operating costs were less than $100 per acre and 13 seasons, 50 percent, when less than 40 cents per box.

There was considerable difference between the average reeturns above operating costs per acre for the first 10 seasons, $40.07, and for the remaining 16 seasons, $201.19. The latter figure is five times the former. Average returns above operating costs per box for the latter period was 263 percent of the former period (71 and 27 cents, respectively). There was one season in each period with negative returns above operating costs.

Returns above operating costs were the lowest in 1947-48 of the 26 seasons, when the returns from fruit lacked $21.97 of paying operating costs. On a per-box basis, the loss was seven cents. During this season there were 141 groves, 65 percent, on which the fruit did not return operating costs.

However, the following season, 1948-49, only five groves, 2.5 percent, failed to return operating costs. In 1951-52, 59 groves, 30 percent, failed to return operating costs and in 1956-57, 30 groves or 19 percent. There has not been a season of these 26 when all groves returned operating costs. One or more groves were in the red in every season. Thirty-six percent of these groves returned less than $100 per acre above operating costs and 76 percent less than $300 in 1956-57.

In the 1956-57 season 53 percent of these groves returned less than 50 cents per box above operating costs and 86 percent less than $1.00. The variation was from a loss of $1.00 per box to a net of $1.68 and returns above operating costs averaged 42 cents per box.

At the rate of returns above operating costs in 1946-47, 65 acres of grove would be necessary to return $3,600 to the owner for interest on the grove investment, interest on borrowed money, his own supeervision and profit, if any.

However, at the 1948-49 rate of returns above operating costs, only 15 acres would be required for a return of $3,600; in 1949-50, 10 acres; in 1950-51, 15 acres; in 1951-52, 59 acres; in 1952-53, 24 acres; in 1953-54 26 acres; in 1954-55, 32 acres; and 1956-57, 31 acres.

There were eight of these 26 seasons when returns above operating costs were lower per acre than in 1946-47 and 20 when they were lower than 1948-49. The averages for these two groups were $18.21 and $75.73 per acre, respectively. At $18.21 per acre returns above operating costs, 198 acres would be necessary to net $3,600 while 48 acres would be necessary at the rate of $75.73 per acre, and 26 acres at the 26-year average of $139.27.

Interest on grove valuation has been figured at 6 percent since the inception of this project. Each cooperator was asked for his estimate of the valuation of his grove when considered as a long-time fruit-growing enterprise. The results were that conservative figures were given and there has been a reluctance on the part of the cooperator to change his valuation even after a substantial change in fruit prices and grove sale prices.

Interest on grove valuation by seasons varied from $28.87 per acre in 1940-41 to $67.75 in 1956-57. The average was $41.97 for the 26 seasons. Interest per box varied from 10 cents in 1943-44 to 40 cents in 1933-34 and averaged 17 cents.

Interest in 1956-57 averaged 24 cents per box. One out of 50 groves had interest charged at less than $54 per acre and 22 percent at less than $66.

Total cost without owner supervision is made up of five items included as operating costs plus the item of interest on estimated grove valuation. This item of interest added 37 percent to the operating costs on the average. Another way of stating the same thing is that on the average the total cost without owner supervision was 37 percent higher than the operating costs.

This increase varied from 23 percent in 1945-46 to 80 percent in 1934-35 and did not amount to less than 47 percent until the 1942-43 season. During the six seasons of 1944-50, this increase in interest charged amounted to 30 percent or less. In 1950-51 and 1952-53 interest on the grove valuation was 36 percent, and 35 percent of the operating cost in 1951-52. Interest was highest in 1956-57 at $67.75 per acre but was only 33 percent of the operating cost.

Net returns in this study mean the amount left to the grower of his returns from fruit after paying operating costs ann interest on the grove valuation. It is the amount left for owner supervision, and profit, if any. There were six of the 26 seasons when returns from fruit failed to pay total cost without owner supervision and another season, 1951-52, broke even.

There were two of these seasons when operating costs were more than returns from fruit. Net returns per acre ranged from –$61.76 in 1947-48 to $395.18 in 1943-44, and averaged $97.30. The first five years of these records, 1931-36, averaged –$1.70 per acre for net returns. The 1936-41 period averaged $13.39; 1941-46, $291.95; 1946-51, $138.25; and 1951-56, $53.75 per acre. There were 14 seasons, 54 percent, with average net returns of less than $50 per acre. There were 15 seasons, 58 percent, ith net returns of less than 20 cents per box, and four seasons had net return of $1.30 or more per box. The average was 40 cents per box with only nine of the 26 seasons exceeding this amount.

In 1956-57 the net returns after figuring interest on grove investment was $50.22 per acre. Twenty-nine percent of the groves that season did not have sufficient income to pay all costs. Fifty-four percent of these groves had net returns of less than $100 per acre and 82 percent with less than $300. Forty-eight percent of these groves had net returns per box of less than 25 cents in 1956-57 and 84 percent with less than 75 cents.

Burglar — "What are you laughing at?"

Householder — "That you come at night without a light to look for money when I can't find any in broad daylight."

CITRUS INSECT CONTROL FOR SUMMER 1960 . . .

(Continued from page 3)

affect color as much as 1.3 percent oil, and will aid in greasy spot and purple mite control. However, a mixture of oil and parathion may cause a leaf drop if applied during dry weather. If parathion is used, follow precautions on the label.

Malathion at 0.75 to 1.25 pound of active ingredient per 100 gallon is also an effective scalicide. Use the dilute dosage for light infestations and the maximum dosage for heavy infestations. An effective mixture for light infestations is 0.5 pound of actual malathion plus 0.5 percent oil. For heavy infestations, use 0.75 pound of malathion plus 0.7 percent oil. There has been less leaf drop with the oil-malathion combination than with parathion mixed with oil. Malathion is much less hazardous to use than parathion, but is more expensive.

Rust Mite Control: The summer control program is of primary importance in the prevention of rust mite injury. This is true because rust mite is normally more numerous and for this reason, more difficult to control from late May to early August than at other times. With this fact in mind, it is obvious that the most effective control program should be used in the summer. Such a program includes the following: 1) keep rust mite populations at a low level prior to application of the summer scalicidal spray, 2) use the right amount of the most effective rust mite miticide, and 3) apply sprays thoroughly. If this program is used, excellent summer control of rust mite will be obtained and control will not be difficult during the fall and winter. On the other hand, rust mite control may well be an expensive disappointment if any part of this program is neglected.

Rust mite occasionally multiplies rapidly to high populations before the summer spray can be applied. Except where the summer spray must be delayed beyond mid-July, this will rarely occur if zineb or Chlorobenzilate were properly used in the post-bloom spray. It most frequently occurs where sulfur was used post-bloom. If a build-up does occur before the summer spray can be applied, rust mite should be controlled to prevent russet and leaf-drop and to increase the effectiveness of the summer spray. Sulfur dust is economical and effective for the short interval of control that is usually required at this time. Zineb or Chlorobenzilate sprays may also be used, but it is generally preferable to use these materials later with a scalicide.

The most effective rust mite miticide is zineb. In terms of length of control, it is also the cheapest. Chlorobenzilate, although not so long-lasting as zineb, is superior to sulfur. Both zineb and Chlorobenzilate may be used with parathion, malathion, oil emulsion or mixtures of these materials, but sulfur cannot be used with oil.

Zineb should be used at 0.5 pound per 100 gallons of spray. This dosage is also satisfactory for Chlorobenzilate. The higher dosage of 1.0 pound will produce a slight, but generally insignificant increase in the interval of control. The higher dosage of zineb is not required unless zineb is used for greasy spot as well as rust mite, or unless the fall application for spider mite and rust mite is to be omitted or delayed.

The effectiveness of zineb is greatly decreased by all copper compounds and zineb should not be used in the summer spray if copper in any amount or form is to be included. The effectiveness of Chlorobenzilate is not reduced by copper and should be used in place of zineb if any copper compound is used in the summer spray.

Mealybug Control: Where mealybugs are a problem, spray with either parathion or malathion at the dosage used for scale.

Whitefly Control: The insecticides that control scale will also control whitefly, but timing of the spray and coverage of the under surface of the leaves are the most important factors in whitefly control. The summer brood of whitefly adults usually emerges in June, so the scalicide spray should be delayed until after the adults have deposited the eggs. There will be much less sooty mold next fall if whitefly is controlled this summer.

Greasy Spot Control: Summer treatment for greasy spot control will depend upon the post-bloom treatment. If a post-bloom copper was applied, summer oil plus zineb for rust mite control should control greasy spot. If parathion or malathion is used as the summer scalicide, add about 0.3 pound of metallic copper in the form of neutral copper, per 100 gallons and substitute Chlorobenzilate for zineb. If no copper was used in the post-bloom spray, the amount in the summer spray should be increased to 0.5 pound of metallic copper. This higher amount of copper may enlarge melanose lesions, causing star melanose, and should not be used on oranges grown for the fresh fruit market. The addition of 0.3 pound of copper to oil will also be more effective than oil alone and is recommended where copper was not applied post-bloom. As mentioned under "Rust Mite Control", do not combine copper with zineb.

The best time of application for greasy spot control has not been determined, but the spray should be applied within four to six weeks after the last flush of growth.

Red Spider Control: Citrus red mite (purple mite) will rarely be a problem before fall where oil is used in the summer or where zineb or Chlorobenzilate is used instead of sulfur in summer parathion or malathion sprays. Texas citrus mite is also adequately controlled by oil, but may be a late summer or early fall problem in groves sprayed with zineb or Chlorobenzilate plus parathion or malathion.

If citrus red mite or Texas citrus mite must be controlled before fall, good results may be obtained with 0.5 pint of Trithion liquid concentrate, 1.0 pound of Trithion powder or 1.0 pint of Kelthane per 100 gallons of spray. None of these materials, however, will eliminate the need for the regular fall miticide. Trithion may blemish grapefruit, but may be safely used on other varieties.

Thompson Named Agri. Commissioner To Fill Out Mayo's Term

Tallahassee—Lee Thompson, Administrative Assistant in the Florida Department of Agriculture was today appointed Commissioner of Agriculture by Governor LeRoy Collins to fill the unexpired term of Nathan Mayo who passed away recently.

Thompson, a long time careerman with the Department has worked for the State of Florida for 32 years in various capacities. He was formerly chief auditor of the Department of Agriculture and in 1957 was appointed Administrative Assistant to Mr. Mayo.

Thompson said he plans no specific changes in the operations of the Department but rather will start the preparatory work necessary to accomplish the reorganization of the Department as passed by the 1959 Legislature and which will become effective January 1961.

The new Commissioner is 52. He and his wife Alice live in Tallahassee. They have three children and three grandchildren. He is a veteran of World War II, an Episcopalian, and a member of the Exchange and Elks Clubs. He was born in New Smyrna Beach and lived in Live Oak prior to coming to Tallahassee in 1930.

Nicholson Tells His Version Of The History Of The Temple Orange

. . . By . . .
DONALD JOHN NICHOLSON
ORLANDO, FLORIDA

Several times during the past 40 years horticulturists of the United States Department of Agriculture, and others have written numerous articles pertaining to the history of what is now known as the Temple orange. In none of these publications has it ever been shown exactly when, and where, and by whom, and under what particular circumstances this natural hybrid citrus variety came into being in the United States.

Having been a private citrus plant-breeder and citrus grower for a number of years, I found a gentleman in Oveido that had lived there all his life and his father before him, which informant is well known for his honesty and integrity and whose word is unimpeachable.

This man now close to 78 years of age, gave me permission to obtain budwood from a particularly fine type of Navel orange, which was extremely prolific, and fruits far above the average quality.

We became engaged in general citrus conversation, and he volunteered the information which I am about to divulge, which was obtained in Oviedo, Seminole County, Florida, about 1937 to 1938.

Within several hours of the time I was given this remarkable history, I had written it down in a large notebook which I still possess as proof of what I had learned about how the "Queen" orange, or "Jamaica Orange," as the five original propagators of what is now known as the Temple orange, called the new fruit. It was called Queen Orange for it was about the same shape of the rough-skinned King Orange, hence this name was chosen by these men as as good a name as any other.

"It was about the years 1884 to maybe 1886, that a Philadelphia fruit and vegetable buyer for a commission house in Pennsylvania came to Oviedo, having just returned from a business trip to Jamaica, for the purpose of buying fruits and vegetables, since Florida had had a freeze and none was available in our State.

He saw my father first, and told him that he had brought back with him a few strange beautiful red-skinned fruits, which he found in the back yard of a Jamaica woman's house, where he was boarding on that Island. This Philadelphian said the flavor and looks of the fruit were so interesting and new, that he felt growers in Florida might like to see them too. And forthwith presented the samples to my father. My father in turn showed them to four other men, one a yellow-skinned negro, by the name of Bostain.

The salesman or buyer asked my father if he wanted budwood of the new variety, which of course he did, and the Philadelphian promised to bring back more fruits and budwood after making his second trip to Jamaica, which he did, giving it to my father.

My father presented some of the budwood to three white men, one a relative, and some of it to Bostain the colored man, for only five men began the original propagation of the "Queen" orange, which was the commencement of what is now a great and popular commercial orange produced by the millions of boxes.

I remember my father telling me what a fine orange it was and that they were all glad to get it.

Then some years later they learned that one or more large commercial citrus nurseries were propagating and selling trees known by the trade name, Temple Orange. None of the five Oviedo original propagators had ever sold or given away any of this budwood, and wondered how it came that their own variety was being grown and sold without permission or their knowledge.

One of the men went down to where this nursery was located and demanded to know what was going on, and was told that they had no rights growing and selling something that belonged to us. And they paid $10,000.00 to them after coming to an agreement.

A certain local citrus budder, we are fairly sure took this "Queen" orange budwood and doubtless took it to the Temple place and budded the tree that was found later fruiting on the property, which fruits, tree were identical to those fruits and trees of ours.

This is the story excepting the names of all the five original propagators and the citrus budder who is presumed to have taken budwood without express knowledge or permission of the owners of these trees. I do have the original narration in my files.

I respected my informant's wishes regarding publication of this most revealing early history of exactly how and when, and from whence this hybrid, the Temple orange originated in Florida, but since all of the principals involved in this matter have died, I feel free to divulge this important data publicly.

I have told the story in essence, just as it was told to me unsolicited. I do have and shall always retain those original notes written by me several hours after receiving this vital historical data for future reference if ever it be needed for confirmation. I have always felt this early history of the Temple orange should have been placed in the records years ago so that we might have an accurate story.

I have just today, March 13, 1960, read in the Orlando Sentinel, Sunday issue, the following article written by Mr. Wyndham Hayward:—

"An important research experiment is under way to determine once and for all the rootstock on which the 'original" Temple orange tree growing in the Hakes-Rodgers orange grove off Palmer Avenue in Winter Park.

"Years ago it was reported that this first Temple tree, of such mysterious origin, was budded on grapefruit stock. The statement was made that a sprout came up from the root of the original tree and proved to be grapefruit. Dr. Harding has his doubts about this, believing that the sprout might have come up from a grapefruit seed dropped by a person or some animal, perhaps a squirrel.

"So cultures have been made of sections of root, to make them sprout and show the characteristic foliage of whatever rootstock may be the one in question; also root ends have been cut and brought to the surface, to sprout new growth. If the rootstock does not prove to be grapefruit, it might confirm Mrs. Del Masin's memory that the late Mr. Hakes told her father, William Chase Temple, that

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Russian Plant Surgery

By F. M. Zorin
Of Sochi (Russia) Experiment Station

EDITOR'S NOTE — The following article was submitted to The Citrus Industry by Frank M. O'Byrne, prominent Florida citrus grower, who with his wife visited the Sochi Experiment Station in Russia last year. O'Byrne expressed the opinion that the "Friendship Tree" mentioned in the article shows that these Russians were anxious for world friendship.

Translation of this article as indicated by quotations was by C. D. Sherbakoff.

This paper was published in Moscow, August 1959. In the introduction it is stated that "the discussion presented here is based on a large experimental material with applications of surgery in practice of plant culture, mainly with citrus frut trees." And that "the author describes some unique experiments in developing 'tree-orchards' which are used for obtaining vegetative-sexual hybrids of cultivated fruit trees."

In the first chapter are described the generally known methods of obtaining better plant varieties such as selection of seedlings obtained from seeds collected from better trees, seeds collected from better hybrids, and seeds collected from recrossed better hybrids. The author states that I. V. Michurin (leader of the vegetative hybridization' idea) and his followers "introduced much new in the latter method, and using it, developed many new, valuable varieties oy fruit and berry plants." In this connection it is mentioned that "thus was developed a new mandarin outyielding all others obtained from abroad."

While recognizing the great value of sexual hybridization in plant breeding, the author says that "the breeder cannot solve with this method alone, all the problems before him," such as obtaining some very wide crosses, developing high quality grapes resistant to phylloxera," etc. Therefore, he concludes "it is necessary to develop some other methods of solving these problems."

According to the author, "plant organism presents inexhaustible possibilities of variability but that these variabilities are not known. For instance, one of the causes of change in a plant is that of wounding it in the grafting. Hence the latter may become an important operation in influencing plant nature."

"Even though plant grafting has been practiced for thousands of years, yet up to recent years the specialists did not suppose that it could be possible to graft leaves, flower buds or fruits, or to perform the extremely delicate operation of grafting wheat embryos."

At the beginning of the chapter "New Methods of Grafting", it is asserted that "one of the causes of appearance of new forms of plants is the wounding or more precisely the growing of tissue over the injured area, (the tissue) known as callous."

"In this callous there may develop new buds, and also roots, but the main thing is that the appearing organs may be found to be unlike those on the other parts of the mother plant. Still more interesting, new forms appear from mixed callouses where the two different varieties join."

"Some changes in a plant organism appear also under influence of some other causes: if a particle of one plant is grafted on another and is nursed by the leaves and roots of the stalk plant, the latter may give some of its characters to the scion."

"The actual development and scientific bases of the vegetative hybridization is due only to the principles of the Michurin biological science."

"The technique of the grafting used by us for obtaining vegetative hybridization is unique. In some cases surface on the grafted plant may reach a meter in length, while in another instance it may be so small as to be hardly visible to an unaided eye. Here are grafted not only the usual sticks of scions or buds but also some entire plants, branches, parts of buds, roots, and embryos. Here are described some of the methods of the grafting."

"Now about some of the vegetative hybrids obtained by us: — Between the grown together trunks of a seedling of mandarin and citrange (hybrid of trifoliata and orange) appeared a twig with large, sharp pointed, dark colored leaves. In 1957 on

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RUSSIAN TREE SURGERY

(Continued from page 16)

this twig developed fruit in shape similar to mandarin, but in size, skin tightness and taste approaching the five seeedlings obtained from this characters of an orange. None of the fruit looked like either of the grafted trees."

"Another vegetative hybrid appeared at the place of union between a new variety (Black-Sea mandarin x trifoliata). In 1957 there developed on it three fruits of good taste; from these 14 seedlings were obtained, one of which was a true trifoliate, two near like a mandarin and the remaining 11 had the characters intermediate between the grafted trees."

"In 1958 we obtained several very interesting vegetative citrus hybrids. A considerable number of vegetative hybrids of economic and scientific significance were created by Professor Mampor at the Sukhum Experiment Station."

"Forgotten buds. In connection with the description of different methods of grafting, it is necessary to tell also about the so-called forgotten buds. If a grafted bud happens to be forgotten and thus the part of the tree above the grafted bud is not cut off next spring, the grafted bud usually does not develop into a normal twig. It may not be dead and may become a particle of the vegetative body of the tree on which it was grafted, and may be overgrown by cells of the latter and be quite unnoticeable. If a year later, the part of the twig just above the forgotten grafted bud is cut off or otherwise destroyed, the grafted bud may break through and start developing."

"The plant which grows out of such bud deserves special attention. In most of these cases, the new twig will acquire characters of the tree on which it develops, but there may also appear some new characters, sometimes such an important one as that of greater cold resistance."

"The buds taken from young seedlings are subject to a greater variability than the bud of established varieties of trees. In the fruit-tree nurseries it is common to insert two or even three buds on the same seedling. Of these only one develops. The others either die or become dormant due to some cause totally unrecognizable (new) plant. 'Forgotten buds' —is nature's reminder of those possibilities which man may use in selection of fruit and wild plants."

TREE-ORCHARDS

In the orchard of the Sochi Experiment Station there is a tree in the crown of which are growing 45 different species and varieties of citrus: 12 varieties of mandarin, 8 or orange, 9 of lemon, 6 of grapefruit, and 10 of different citrus hybrids. This tree was developed to provide in one tree a visual demonstration of the diversity of different citrus" . . . . There "side by side with the gigantic fruits of the pomelmus Ou reaching 12 cm. in diameter, hang the fruits of kinkan of the size of a cherry. Japan's mandarins, Italian lemons, and American grapefruit grow on the same tree surrounding the new varieties which were developed at the Sochi Experiment Station."

"This unique tree is of great interest to our guests from abroad who often visit this station." The author enumerates the names of guests who were invited to insert a citrus bud into this tree-orchard which is called 'tree of friendship'. A description of the manner in which the tree was developed is given but any experienced citrus tree propagator can readily decide how it should be done.

"The tree-orchard may be of economic and scientific importance. The thing is that the fruits which develop on such a tree sometimes change in form, size, color, time of ripening, so much that they could not be identified. It appears as if the tree itself were creating new varieties. This may be well understood (since) here in one organism are united living parts of different varieties and species, characterized by different nature and different biological properties. In them takes place definite processes of exchange of different substances with the mutual influence of the different components of the grafted elements. In this mutual effect lies the basic idea of the experiments described here."

The author then states that if a variety is too susceptible to low temperature then graft it on a cold resistent tree; if it is affected by a disease, graft it on a tree resistent to it; and so on. Then the author cites "some examples of changes of different varieties growing in the crown of the tree-orchard:"

"On one side of our 'tree-orchard' is grafted mandarin of pomelmus Ou. Each year in the course of many years it gives fruits more and more changed from the typical one of this variety. Usually the fruit skin of Ou is rough, bumpy, and the tip of the fruit is depressed. The fruits developing on the 'tree-orchard' are, however, smooth all over, including the tip.

"Some interesting changes were noticed in the seed of the hybrid 3 (orange x mandarin Unshi). Usually its seed is rounded with a sharp, slightly bent 'nose' but the seed from the fruits growing on the 'tree-orchard' become flat and with veins on one side. Other grafts on the 'tree-orchard' remained more stable in their characters. Freezing also left its imprint: New varieties of mandarins stood the freezings considerably better than the Unshi mandarin".

"During recent years we have raised another 'tree-orchard', specially for selection purposes, this time paying special attention also to selection of the different varieties and species entering into the make up of the stalk complex." For this were used "10 different citrus (evergreens, partly evergreens and decidious): two mandarins, citrange, citrangequat, Unos, and five biologically different wild lemons. The tree has 10 stems and its crown consists of 18 specially selected citrus varieties and species, as follows: (1) Anogamic mandarin, (2) mandarin 320, (3) orange selection 2006, (4) orange 2008, (5) trifoliat, (6) a lemon selection, (7) lemon selection 2021, (8) hybrid 3015, (9) hybrid 117, (10) hybrid 118, (11) pomelmus Ou, (12) hybrid orange x

mandarin x grapefruit, (13) vegetative hybrid of Black-Sea mandarin x trifoliat, (14) Kinkan, (15) Citrangequat, (16) hybrid 3, (17) Duncan grapefruit, (18) hybrid 10—mandarin Unshi x orange."

The purpose of the second "tree-orchard" seems to be also to reduce the effect of the mother plant on the grafts.

COMPARISON OF THE TWO METHODS OF HYBRIDIZATION

"Usually hybrids are products of one male and one female variety. But often it is desirable to combine characters of three or even more of the different varieties." It takes too long a time to get that by the standard cross pollination, thus the "vegetative' hybridization may be more practical."

"As was stated before, in the crown of the 'tree-orchard' it is possible for us to obtain vegetative-sexual hybrids combining forms entering into the combination".

"For this purpose a flower from a variety is grafted by the approach method to a branch of another variety and then pollinated by a third variety. When the young fruit is set, it is cut off from the mother branch and thus completely goes over the stalk variety.

"Sometimes the form of the fruit remains unchanged but the seed may change. For instance, a fruit of the hybrid Unshi orange which in 1947 was transferred to and developed on a branch grafted on another hybrid (kinkan lemon) externally showed no noticeable changes but its seeds were of a drawn out form and of dark brown color, while the seed of the check hybrid were round and white."

In some cases no change can be noticed in the fruit of the first year but some changes may show up in the fruit of second year.

"The fact of obtaining hybrids from three starting kinds of citrus simultaneously is very important. Even though the signs of hybridization in vegetative and vegetative-sexual hybrids are similar to those of sexual hybrids, they are expressed somewhat differently. For a comparison of these hybrids of different types, they are set out at the Sochi Experiment Station in a row. But even with only slight experience one could not mistake vegetative hybrids for sexual ones."

"It is permissable to expect that the complex vegetative-sexual hybrids would bear economically good fruit. However, at the present moment in the first place stands the question, not of the quality of the fruit, but the question of a principal solution of this very important (method) in the business of plant selection.

WHAT WILL THEY THINK OF NEXT?

In a recent issue of Mutual's weekly publication, The TRIANGLE, under the heading, "FUTURE CITRUS GROVES UNDERGROUND?", appeared this two paragraph item:

"Farms of the future may go underground where temperature, weather conditions, plant diseases, nutrition and lighting can be accurately controlled regardless of the season or weather.

"According to Robert L. Zahour, manager of application engineering for the Westinghouse lamp division, this means that such foods as bananas, oranges, grapefruit, lemons and other items which are now raised almost solely in tropical areas, could be grown in entirely different climates —possibly in Alaska or Siberia."

THE CITRUS INDUSTRY ADVERTISING PAYS DIVIDENDS

Crop Estimates of Citrus Production Is Hazardous . . .

By John Sikes
Florida Citrus Mutual

Obviously, it's deadly serious business to forecast the size of an agricultural crop. This applies particularly to Florida citrus.

Growers, with hundreds of millions of dollars invested in groves, equipment and production costs, must make their marketing decisions to conform with their interpretations of the natural law of Supply and Demand. If these decisions are made on an overestimation of Supply, which firm Demand will not assimilate, their crop income is almost certain to be reduced by the thousands of dollars. The figure will run into the millions when applied to the composite of citrus growers in Florida.

This has been a somewhat tricky season for citrus crop forecasts, with the government's estimates of orange and grapefruit supplies shifting in the latest forecast.

In the April U. S. Department of Agriculture crop estimate just out, the government reduced its forecast of the 1959-60 California orange crop by nearly 3,000,000 boxes. It also reduced its estimate of Early and Midseason Florida oranges by 1,300,000 boxes, but added back to its estimate of Florida Temple orange production 300,000 boxes and put 1,000,000 boxes more on its estimate of the size of the Florida Valencia orange crop, just now coming into volume harvesting. Thus, evening up on its forecast for all Florida oranges.

The same estimate reduced the forecast for Florida grapefruit by 1,000,000 boxes this late in the season, untimely for any grower benefit.

From the beginning of this season's forecasts last October, Florida Citrus Mutual's Bob Rutledge, basing his judgment on direct reports from a majority of the 10,000 Mutual grower-members and the Mutual field men who keep daily check on production and pick-out, has insisted the government has consistently overestimated the grapefruit crop.

While Rutledge, likewise, has believed the government has forecast, from the beginning, a larger early and midseason orange crop than would pick out—and has now had his judgment confirmed by the latest government estimate—he has not been overly critical of the USDA's predictions for the overall Florida orange crop. However, he cannot justify the government's "evening up" of the possible Florida orange supply by reducing early and midseason orange estimates and increasing Temples and Valencias.

"Mutual has anticipated the lowered forecast in Florida early and midseason oranges because every indication for the past four months has been that this crop would not pick out as high as the government's previous estimates," Rutledge said.

"However, we question the government's action in adding to the Florida Valencia estimate at this time. There just isn't enough evidence to support this action."

Rutledge cautioned growers to be careful in their marketing conclusions and decisions from here on out, thusly

"There's been a tendency all season long for many people to overestimate the Florida orange crop because of the overpick we experienced last year. I'm afraid this will lead to disillusionment not only on the crop size, but as to juice yield for concentrate as well. These people are talking themselves into a larger crop and higher juice yield rather than looking at the facts. Florida growers, from here on out, should listen long and hard at the facts and our interpetation of them."

Hotels, Restaurants and Cafeterias Increase Consumption of Citrus Fruit

A Florida citrus official has formally recognized the rapid growth of food outlets such as restaurants, hotels and cafeterias, and attributed to that group much of the credit for the rise of the Florida citrus industry to world prominence.

Homer E. Hooks, general manager of the Florida Citrus Commission, in a speech before the Northern Illinois Stewards and Caterers Association in Chicago, said, "The growth of our industry in Florida from 15 million boxes of oranges to 93 million boxes in just 25 years would not have been possible without the vigorous support of such an important element of food sales as you represent."

Hooks said food producers and processors, such as those in the Florida citrus industry, are prone to be more conscious of sales to retail consumers than to institutions serving the dining public.

"I think sometimes it is easy for us to overlook the institutional distributor," he said. "We are so conscious of the housewife pushing her cart down the aisles of the supermarket that we often forget that she may very well eat dinner that night in a downtown restaurant."

Hooks cited the growth of dining institutions as "a significant portion" of the total food business.

"The annual value of meals served outside the home is approximately $16 billion today, and it is expected to reach $26 billion by 1970," the citrus official said. "This is better than a 50 per cent gain in institutional business, which is far greater than the expected total increase in all food business during the next 10 years."

The percentage of food and beverages consumed outside the home now is about 22 per cent of the total food business, he declared,

He cited mobility of today's living, easier transportation, population shift from rural to urban areas, population increases, more youngsters in schools and colleges, growth of hospital facilities and wider use of hospitalization insurance, longer life-expectancy and more and better facilities to house and feed the aged, and the rapid rise in national income as reasons why food sales outside the home will continue to boom.

Hooks explained how the Florida Citrus Commission had cooperated with the institutional food trade in the past, and pointed out that the Commission's research department was diligently seeking ways and means of improving present citrus products and attempting to find new ones.

On the horizon in the future is a "high-density frozen orange concentrate" which, Hooks said, the industry hoped to "sell more juice in the same size can." He said this product had been test marketed and a survey would be conducted shortly to determine how consumers will react to the product.

Another new product in the laboratory stage, he said, was "instant" orange juice. He described this as a "whole orange juice in powdered form," not a synthetic.

Hooks added that "we will be knocking on some of your doors, seeking ways that we can help you build your sales and profits through use of fresh or processed citrus from Florida."

Tentative Program

Seventh South Florida Citrus Institute --- Camp Cloverleaf

Tuesday, May 31 and Wednesday, June 1, 1960

Monday, May 30

Registration

6:15 p.m.—Supper — Citrus Hall

8:00 p.m.—Recreation — Auditorium

Tuesday, May 31

7:15 a.m.—Breakfast — Citrus Hall

8:55 a.m.—Assembly — Auditorium — David Martsolf, presiding

9:00 - 9:05—Invocation — The Rev. George Calvin Stulting, First Presbyterian Church, Sebring

9:05 - 9:10—Opening Remarks and Announcements — K. S. McMullen, District Agent

9:10 - 9:30—Drainage Criteria for Flatwoods Citrus — D. S. Harrison, Asst. Agri. Engineer, Agricultural Extension Service

9:30 - 10:00—The State Plant Board's Citrus Programs — Dr. W. G. Cowperthwaite, Commissioner, State Plant Board

10:00 - 10:15—RECESS

10:15 - 12:15—Grove Equipment Demonstration — D. S. Harrison in charge. The Institute Advisory Committee felt that all citrus growers would like to see the various types of equipment "designed to do the job" in young citrus groves, demonstrated. We have asked Dalton Harrison to contact the Florida Retail Farm Equipment Assn. and invite them to demonstrate tractors, treehoes, banking machines, etc., in our young 5-acre grove during this period.

12:15 - 1:30—LUNCH —Citrus Hall — Fred P. Lawrence, presiding

1:30 - 2:00—New Citrus Product Development—Where do we stand; What are our Possibilities? — Dr. L. G. McDowell, Director of Research, Florida Citrus Commission

2:00 - 2:10—The Tolerance Information Center — Jack T. McCown, Asst. Citriculturist, Agricultural Extension Service

2:10 - 2:20—RECESS

2:20 - 2:50—Soil Science Foundation's Approach to Growing Citrus on Acid Sandy Soils — Dr. O. C. Bryan, Technical Director of the Foundation

2:50 - 3:00—The Florida Research Foundation — Herman F. Steele (Asst. Mgr., Florida Citrus Mutual), Secretary of the Foundation

3:00 - 3:30—Pruning and Hedging Experiments — A Progress Report — Dr. Al Krezdorn, Asst. Horticulturist, Citrus Experiment Station, Lake Alfred

Wednesday, June 1

Presiding: James E. Brogdon, Associate Entomologist, Agricultural Extension Service

9:00 - 9:05—Opening Remarks and Announcements

9:05 - 9:20—The Greasy Spot Situation — A Quick Report — Bill Mathews, Asst. Horticulturist, Agricultural Extension Service

9:20 - 9:30—Brown Rot and Its Control — Another Quick Report — Fred P. Lawrence, Citriculturist, Agricultural Extension Service

9:30 - 10:00—Trends in Spray Costs — Zach Savage, Agricultural Economics Dept., University of Florida

10:00 - 10:15—RECESS

10:15 - 10:45—A Look at the Long-Time Results and Trends of the Citrus Station's Insect Survey — Dr. W. A. Simanton, Entomologist, Lake Alfred Citrus Station

10:45 - 11:15—Effective and Economic Control of Citrus Mites — Dr. Roger Johnson, Associate Entomologist, Lake Alfred Citrus Station

11:15 - 12:00—Effective and Economic Control of Citrus Scales — W. L. Thompson, Entomologist, Lake Alfred Citrus Station

12:00 - 1:30—LUNCH — Citrus Hall — W. H. Mathews, presiding

1:30 - 2:00—The Possible Role of Tolerant Rootstocks in the Control of Spreading Decline — Dr. W. A. Feder, USDA Horticultural Station, Orlando, and Dr. H. W. Ford, Lake Alfred Citrus Station

2:00 - 2:30—The Morrocan Citrus Industry, with special consideration of the stubborn disease problem — Dr. J. F. L. Childs, Plant Pathologist, USDA, Horticultural Station, Orlando

2:30 - 2:45—RECESS

2:45—Cold Protection Methods — A Panel Discussion — Moderator — W. H. Mathews

Panel Members:

1.—Heaters — Elton Clemmons, Production Mgr., Wartman Estate Groves, Citra, Florida; Robert Sorrells, Sorrells Fruit Company, Arcadia, Florida

2.—Wind Machines — Arch Updike, Jr., Alcoma Groves, Lake Wales; Franklin Ward, Ward's Nursery, Avon Park, Florida; Don Bryan, Production Mgr., Lake Garfield Groves, Bartow

3.—Chemicals — Dr. C. H. Henderschott, Asst. Plant Pathologist, Citrus Experiment Station

4. Irrigation — George O. Nordmann, West Volusia Nursery, DeLand; T. S. Dorrance, Jr., General Mgr., Tropical Farm, Lake Placid

5.—Over-all Cold Protection — Warren O. Johnson

Frozen Orange Concentrate Use Records Broken

The consumption of Florida frozen orange concentrate in the past four months has broken all previous records for the use of the product, Robert W. Rutledge, Florida Citrus Mutual general manager, said today

R. W. (BOB) RUTLEDGE

in a report on what consumer sales mean to the grower.

Rutledge said that there has been a tremendous change in the consumer purchase pattern for concentrate in the first 18 weeks of this season's marketing period from Dec. 1.

"Consumer purchases of concentrate are 35 percent greater than actual sales for the comparable period last year," Rutledge said. "This unprecedented increase amounts to 340,000 gallons of concentrate per week which establishes an all-time record for purchases of this product."

He said so far this season consumers have spent an average of more than five million dollars per week for frozen orange concentrate.

"U. S. economy has shown a definite increase over the past four years with more people with more money to buy more orange concentrate at a more favorable price," Rutledge said.

"This season we expect U.S. consumers to purchase 64,500,000 gallons of concentrate in the conventional six and 12-ounce cans," Rutledge said. "This would show an increase of 24 percent over last year."

Rutledge said a continuation of the present rate of sales would account for the disposal of retail sizes resulting from an 85 million gallon pack this season.

"However, Mutual is still estimating a 75 to 77 million gallon pack of concentrate for the season," he said. "The retail portion of this pack will certainly not be sufficient to maintain the rate of sales which prevailed up to this time."

"Based on the assumptions that the current U.S. Department of Agriculture's crop estimate is correct, that the crop is utilized as we have suggested and that the yield will average 1.45 gallons of concentrate per box for the season then the average seasonal price paid to the grower should be 40.5 cents per pound of solids," Rutledge said.

ASSISTANT AGENT IS APPOINTED, 2 RESIGN

One appointment and two resignations in the Florida Agricultural Extension Service have been announced by Dr. M. O. Watkins, director.

Robert M. Davis has been appointed assistant Hillsborough County agent effective June 1. He replaces Jean Beem who was named county agent replacing Alec White, retired.

Davis is a native of Dunedin, and holds a masters degree in animal husbandry from the University of Florida.

Resignations include C. L. Shackleford, assistant Leon County agent and Miss Carolyn Painter, assistant home demonstration agent in Pasco

Nicholson Tells His Version Of The History Of The Temple Orange

(Continued from page 14)

the tree was a seedling."

This article deserves comment. Such determination of rootstock of that certain Temple orange tree is of course of considerable scientific interest and importance in view of the circumstances, however, regardless of whether or not, it be grapefruit or some other rootstock, or even a seedling, which of course in that event it would be, brings on the technical arguments as to why such presently-growing trees would show identical tree and fruit characteristics and habits, as those original introduced progeny budded trees at Oviedo, which material was originally from what is likely the original parent seedling tree in Jamaica.

My personal opinion is, that the findings will be—grapefruit rootstock as originally determined after inspections by competent persons, for any good nurseryman instinctively knows from long experience, especially when he is investigating a case of this kind, that he must be sure of his findings.

One naturally selects or studies only those sprouts coming from the crown-roots or base of such tree in question and we must assume, in this instance, that is precisely what was done.

Certainly there is merit in Dr. Harding's assumption that it very well might have been a seed from a grapefruit dropped close to the trunk of this Temple tree, but I doubt very much if any careful and competent observer sent there for the express purpose of making a check and determination of this rootstock, would have made such a mistake.

AGRICULTURAL ENGINEER J. W. RANDOLPH PASSES

John W. Randolph, 63, agricultural engineer at the Everglades Experiment Station, Belle Glade, died April 18 after a 10-day illness at the Jackson Memorial Hospital in Miami.

A native of Illinois, Mr. Randolph had been employed by the University of Florida Agricultural Experiment Stations since November 1947.

Prior to that he was director of agricultural engineering research for the U. S. Sugar Corp., Clewiston. He also held positions with the United States Department of Agriculture and as professor of agricultural engineering at Auburn.

Mr. Randolph was a graduate of the University of Illinois and of Alabama Polytechnic Institute.

At the time of his death he was conducting experiments on mechnical dewatering of forage crops and methods of harvesting Everglades fiber crops.

NEW 4-H SCHOLARSHIP

A $200 annual scholarship for a junior in the University of Florida College oy Agriculture has been established by Wiler M. Bassett, Jr., of Monticello, according to Dean Marvin A. Brooker.

It has been named the Raymond W. Blalock 4-H Club Scholarship in honor of the man who led boys' 4-H Club work in Florida from 1918 to 1950. It will be awarded on the basis of excellence in 4-H Club work, grades in the University College, and financial need.

Let me give you a tip, boys. You'll make money easier and faster buying U.S. Savings Bonds. They now pay 3¾ % you know.

The LYONIZER

COMPILED BY THE LYONS FERTILIZER COMPANY

Reports Of Our Field Men . . .

NORTH CENTRAL FLORIDA

V. E. Bourland
Winter Garden, Fla.
Phone 107

We are having nice spring weather now, and most all the groves have been worked. Lakes are full of water, and some roads are under water yet.

Groves are looking very good. Most of bloom are gone, lots of little fruit. Most of growers are busy spraying, working and fertilizing young trees.

Valencia oranges are beginning to move pretty fast, but test won't go to well yet. Still moving grapefruit, and most of it is good.

Vegetable and melon growers still having their headaches. Lots of spraying.

Pastures are looking g r e e n again, where water is off, and cattle are improving every day.

WEST HILLSBOROUGH, PASCO AND PINELLAS COUNTIES

J. W. Boulware
Phone WEbster 8-2638
Tampa, Fla.

Our groves in general remain in excellent condition. It is particularly important at this time of the year, to maintain the trees in top condition in order to properly set and grow the new crop.

Due to the heavy rains in late March we are going to recommend the next application of fertilizer a little earlier than usual. For most groves that used an early spring top dresser, we will recommend the summer application for May or early June.

We have had considerable trouble this spring with insects. Some of it was unexpected. Insects can build up at an alarming rate and often must be controlled promptly to prevent damage. This is particularly important for the small fruit now growing, our enxt crop.

I will get around as often as I can but in the meantime if anything unusual shows up please call me.

SOUTH HILLSBOROUGH, MANATEE AND SARASOTA COUNTIES

Eaves Allison
P. O. Box 365, Sarasota, Fla.
Phone Fulton 8-2611

The late March and early April bloom is the big news this time. On top of the bloom which started in late January has come a tremendous over-all bloom which is setting fruit like blackberry vines. At petal fall the trees looked like they had rusty snow under them. The original, normal bloom, had already set a good crop of fruit when this whopper came along. There are gonna be some broken limbs come fall!

Conditions are very dry at this time — April 19th — but no wilting or other damage yet. Tomatoes are looking very fine with a heavy crop set. Will be about three weeks later than usual in harvesting. Squash not in very good stand but vines vigorous and picking good.

Some irrigating systems are working now in young groves.

Last applications of that good Lyons Fertilizer are now going on the vegetable crops.

SOUTH POLK, HIGHLANDS, HARDEE AND DeSOTO COUNTIES

C. R. Wingfield
Phone: Glendale 3-4537
Avon Park, Fla.

Dry cool winds during early April did not help either the vegetable or the citrus growers. It brought with it one of the worst infestations of citrus aphids we have had in years, but with warmer weather the conditions are much improved. On Temples the leaves were badly curled.

It is getting rather dry, at the time of this writing, and in some areas irrigation has been started and others will follow if no rains come. The winds have removed considerable moisture from the tree leaf as well as the soil. General conditions have caused an infestation of spider mites and control in most cases have been necessary. While it is not long before oil time they could cause a lot of damage if weather continues dry. The post bloom spray is being applied.

The bloom was very heavy most everywhere but it is a little early to predict what will set. It will be wise to keep our moisture at a good level and if irrigation will be necessary to get started before any wilt appears. A sudden shock might tend to throw fruit. The fertilizer application for the summer is being considered and in some cases being applied. Remember the heavy bloom and give the tree ample plant food to take care of fruit size.

HILLSBOROUGH, PASCO AND SUMTER COUNTIES

C. W. Dean
Gibsonton, Fla.
Phone Tampa 40-2592

This warm weather we are having now and these warm nights are certainly making things grow. The watermelons have really shown their liking for this kind of weather as well as the other crops. It is beginning to get dry in most sections of these counties and people are irrigating where necessary. Citrus men are running the harrows to hold the moisture conditions at the top of the ground which is an asset to the groves. It is true that we had a heavy bloom, but these dry and hot days can do much harm to this young fruit if no means are taken to hold the moisture to the trees.

The peppers, squash, etc., are looking pretty good at this time, much better with this kind of weather. They have certainly had their share of bad weather for the last two or three years.

Valencias have begun moving some now. It should be only a few days that they start moving very rapidly. Grove owners should be applying their post-bloom sprays now and helping the young crop of fruit get a good clean start. Everywhere I have been, the aphid population has been at a maximum. They should have done all the damage they are going to do by now. They have been terrible, but there seems to always be something disturbing all the time.

"Operation Florida Valencia Month" Proclaimed By Governor

Noting that Florida's Valencia oranges are "a vintage crop" and at their "peak of goodness," Governor LeRoy Collins on April 27 proclaimed the month of May as "Operation Florida Valencia Month," and the Florida Citrus Commission launched an intensive advertising and merchandising campaign to consumers and the Northern trade.

The drive will be bolstered by Florida Citrus Mutual, who will advise its 10,000 growers and shippers of the big Valencia push.

Governor Collins, in a telegram proclaiming "Operation Florida Valencia Month," said Florida's sunshine and plentiful rain have produced a vintage crop of Valencia oranges.

"They are now at their peak of goodness," he said. "We want all the citizens of our great country to have the advantage of enjoying our delicious fruit."

The Commission, through its 55-man field merchandising force, is making immediate contact with chain store and super market fresh fruit buyers in order to stimulate interest in the program.

Classified Ads

CITRUS TREES—Quality Registered and Non-registered Citrus trees—Popular Varieties—Rough Lemon and Sour Orange Root Stocks—Complete Planting Service if needed. ADAMS CITRUS NURSERY, Winter Haven, CY 3-6075.

FOR SALE — Few extra fine quality citrus trees left for June 1st delivery. Budwood carefully selected from our groves. Trees grown from "seed to trees" in virgin soil, Certified Nematode free. Nursery site approved State Plant Board. 3M Valencia, 3M Pineapple, 400 Hamlin, 300 Murcetts, all on rough lemon, 40M rough lemon, 15M sour orange liners, will bud your variety for Spring 1961 delivery. WADE H. WARDLAW, Box 83, Phone 3812, Frostproof, Florida.

PACKING HOUSE MACHINERY — Out of 5-car packing house — Washers, Polishers, Steel Sizers, Stamping Machine, and many other items not listed. Write or phone for list.
HOLDEN CAWTHEN
1120 Herndon — Phone State 7-3542
Leesburg, Florida

SEVERAL THOUSAND excellent Hamlins on Rough Lemon available immediately. You quote a price. Grown on virgin soil and Plant Board inspected. Large sizes. L. Sutton, GL 3-4476, Avon Park, Fla.

Tomato Inspection Delayed

Excessive rainfall and cold weather have caused many farmers in Central Florida to replant tomato plants for a third time this season. As a result, State Plant Board inspection of plants scheduled for out-of-state movement has been delayed almost a month.

Advertising in The Citrus Industry Pays Big Dividends

A survey of the middle east coast areas by the Pathology Department has turned up no further evidence of bacterial blight of chrysanthemums.

Consumers Like Good Fruit . . .

With each passing year it becomes more and more evident that the consuming public is becoming more demanding in their insistance upon being supplied with the very top quality of citrus fruit and the best grades of canned and concentrate juices.

As in all commodities Quality brings a premium on citrus fruit . . . and the big majority of Florida citrus fruit producers are exerting every effort to supply the sort of fruit which customers demand and for which they will pay a premium.

Long time users of Lyons Fertilizers will tell you that these fertilizers will produce the highest quality fruit . . . and that the use of Lyons Fertilizers in conjunction with proper production practices will accomplish this result.

Our Field Service Representatives are always glad to consult with you regarding any production problems . . . without any obligation on your part.

LYONS FERTILIZERS Produce MAXIMUM CROPS Of FINEST QUALITY

Lyons Fertilizer Company

Phone 43-101

TAMPA FLORIDA